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ABSTRACT

This study investigated the characteristics of an innovative cooperative high school-college program as perceived by principals of adopting and nonadopting schools. The data from survey questionnaires with 24 Likert-type items were reduced to six factors: observability, status, simplicity, cost, trialability, and relative advantage-cum-compatibility. A discriminant function was used to compare the situational variables of size, per pupil expenditure, and percent of college-bound students. The discrimination between adopters and nonadopters was not significant. The factors of trialability, status, and cost did discriminate significantly between the two groups. A cross-validation correctly classified 69 percent of the group. The adopting group did not, however, appear homogeneous. The factors of status, cost, and trialability entered in discriminating significantly between recent (1977) and earlier adopters. The implications are that (1) educators did perceive definable characteristics of this innovation, (2) adopters and nonadopters perceived this innovation differently, and (3) the dissemination of this innovation may be enhanced by maximizing these characteristics in development and communication. (Author)

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PERCEIVED CHARACTERISTICS OF AN INNOVATION

by

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Abstract

This study investigated the characteristics of an innovative cooperative high school-college program as perceived by principals of adopting and non-adopting schools. The data from survey questionnaires with 24 Likert-type items were reduced to six factors: observability, status, simplicity, cost, trialability, and relative advantage-cum-compatibility. A discriminant function was used to compare the situational variables of size, per pupil expenditure and percent of college-bound students. The discrimination between adopters and nonadopters was not significant. The factors of trailability, status, and cost did discriminate significantly between the two groups. A cross validation correctly classified 69 percent of the group. The adopting group did not, however, appear homogeneous. The factors of status, cost, and trialability entered in discriminating significantly between recent (1977) and earlier adopters. The implications are that 1) educators did perceive definable characteristics of this innovation, 2) adopters and nonadopters perceived this innovation differently, and 3) the dissemination of this innovation may be enhanced by maximizing these characteristics in development and communication.

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Our problem is to learn why, given one hundred different innovations conceived of at the same time--innovations in the form of words, in mythological ideas, in industrial processes, etc. --ten will spread abroad while ninety will be forgotten.
Garbriel Tarde, 1903

Over the last 35 years increasing attention has been given to descriptions and causes of change and the process of bringing about change in individuals and organizations (Cf. Havelock, 1973; Rogers & Shoemaker, 1971; Zaltman, Duncan & Holbeck, 1973). Empirical research has centered on the introduction of innovations with the acceptance or adoption of an innovation by an individual or organization usually being the dependent variable. Within this context, three categories of investigation have emerged: 1) characteristics of the adopters, such as age, status, or attitude, 2) characteristics of the innovations, such as relative advantage or observability, and 3) characteristics of the change process, such as communications, decision making, or techniques of introducing innovations. A guiding assumption of these investigations has been that change is needed or desirable and, further, that it is possible to identify its correlates, predict outcomes, and eventually understand and control change.

From conception and design through dissemination, the development of educational innovations can benefit from

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This study was possible because of the support of Syracuse University Project Advance staff and funding from the University Fund for Scholarly Research.

knowledge of the consumers' perspective. Typically, rational models of producing and introducing changes (cf. Clark & Gub- Note 1) rely on research results to persuade potential adopters. Still, "many projects face the most severe problems in the dissemination stage" (OECD, 1973). Central to these problems is that "failure to assess accurately how an innovation will be perceived may yield unanticipated consequences which retard programs of planned change." (Kivlin & Fliegel, 1967). It follows that chances for successful dissemination of an innovation can be enhanced if planners anticipate actual criteria that adopters will use to make decisions.

Basic research on teaching-learning in education is needed and necessary in educational product development, but, unfortunately, a rational quantitative research decision paradigm has often been promulgated as a paradigm for adoption decisions. This inference about how adoption decisions are made does not account for the observed rate of adoption of innovation. Certainly, the research and development models have had logical appeal, particularly to researchers. Without basic research, the content and design of innovations must be made subjectively, often in response to short term pressures. However, analyses of the adopters' point of view indicates that "decisions to adopt or reject an innovation are seldom made on the prima facie merits of the innovation (Miles, 1964; Coleman, 1972; Rein, 1970)," (Berman & McLaughlin, 1974).

Clear unanomalous examples may be found by reviewing the development of commercial materials used by schools: "If we look at the first 32 mathematics materials listed [in order of most widely used], . . . at best two could be considered to have even a modicum of an R & D base" (EPIE, Note 1). Thus, research and development, desirable though they may be, are neither necessary nor sufficient in explaining adoption of programs or materials. As Curtin (Note 2) somewhat truistically remarked in a discussion of marketing for nontraditional education: "If you try to sell the wrong service to the wrong audience, success is not within your grasp." The level of understanding of such practical considerations is "relatively low among knowledge-producers" (Farr, 1969).

Adoption decisions by schools are usually not made in direct response to knowledge of quantified learning outcomes. The contrapositive of this observation is that, since this empirical-rational process is not used, adoption decisions are not rational. The logic is specious, as schoolpersons, dealing with taxpayers' politics, contractual constraints, intra-institutional power dynamics, and other forces well know. It is "rational" to exhibit political and practical acumen in adoption decisions. Further, describing the particular practical concerns of adopters should, in turn, inform research and development organizations in 1) project selection, 2) aspects of programs which must be fully developed, and 3) the kinds of information which schools will use in

adoption decisions.

"Innovations have perceivable characteristics which can be conceptualized and have empirical utility" (Kohl, 1969). Studies of perceived characteristics of innovations in agriculture and medicine laid the groundwork for describing important characteristics of innovations in education though "there have been fewer research studies designed to probe these points than to answer other major questions" (Rogers & Shoemaker, 1971).

The principal contribution of this study, however, apart from methodological and measurement refinements for investigations of this genre, is to add chips to the mosaic of an inductive description of variables in the change process and, eventually, in planned change.

Characteristics of Innovations

The current study seeks to measure the relationships between adopters' perceptions of an innovation and the actual adoption or rejection of the innovation.

Rogers (1962) used five descriptors to classify the characteristics of an innovation: 1) relative advantage, 2) compatibility, 3) complexity, 4) divisibility, and 5) communicability.* These characteristics of an innovation are among the determinates of adoption or rejection of a

*Relative advantage is the degree to which an innovation is superior to the ideas it supersedes. Compatibility is the degree to which an innovation is consistent with existing values and past experiences of the adopters. Complexity is the degree to which an innovation is relatively difficult to use. Divisibility is the degree to which an innovation may be tried on a limited basis. Communicability is the degree to which the results of an innovation may be diffused to others (Carlson, 1965).

particular innovation by a particular adopter.*

Rogers' five characteristics may easily be refined into an extended list of smaller perceptual descriptors. Elliott (1969) found 52 terms in rural sociology literature. Lin and Zaltman (1973) tabulated 35 characteristics and emphasized that the list, while extensive, was not exhaustive. Most of the terms are "groupable" into relatively few categories: Rogers (1962) uses 5; Elliott (1969) 11; and Zaltman, Duncan, and Holbek (1973) 21.

The reductions or groupings are both empirical and logical. Using a multiple correlation delete method, Kivlin (1960) found three variables (complexity, mechanical attraction, and advantage) out of 11 were highly correlated with adoption among dairy farmers. Factor analysis of a Likert-scaled questionnaire by Hahn (1975) yielded four perceptual groupings: accountability, cost, similarity and complexity. Clinton (1972) identified seven factors related to adoption: relative advantage, cost, compatibility, communicability, risk, and divisibility, though the last two were not found to load significantly for most of the 18 innovations studied. Rogers and Shoemaker (1971) use five attributes and contend most of the terms in previous empirical studies can be logically subsumed under one or another of the rubrics of compatibility, trialability,

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*A "particular" adopter sets this situation apart from adopters in general who must be described first in terms of the powerful antecedent variables, such as economic wealth, which, *a priori*, predict "innovativeness." After identifying an adopter as "innovative," we will still find some innovations accepted and other rejected. "Adoption performance on one innovation is not necessarily a reliable prediction of adoption performance on another innovation" (Carlson, 1965).

relative advantage, observability, or complexity with, however, the caveats that the categories are not mutually exclusive nor are they additive. Further, rather than simply identifying these factors, research is "needed to determine if economic factors tend to cancel out sociological factors and/or vice-versa . . . [and] under what conditions this would most likely happen" (Tucker, Note 4).

Elliott (1969) did basic work in examining "the underlying dimensions (attributes) of practices that cluster together." Thus, he reduced 11 attributes to 3 dimensions (advantage, risk, and compatibility) in one study and, using factor analysis, 15 attributes to 3 clusters (cost reward, psychic reward, and social payoff) in another study. The empirical results have, then, been formative (Elliott, 1969) and it is not possible to make too many generalizations about attributes across innovations (Elliott, 1969; Fliegel & Kivlin, 1966).

METHOD

The Sample

The sample consisted of principals of senior high schools who were believed to know of Syracuse University Project Advance. The sample was divided into two groups: those principals whose schools had made a decision to adopt one or more Project Advance courses and those principals who had requested information on Project Advance or attended informational meetings but had not, subsequently, joined

the program.

Syacuse University Project Advance:

Project Advance offers selected Syracuse University courses in participating high schools. The courses, jointly developed by the University academic departments and the University's Center for Instructional Development, are designed primarily to serve the on-campus population. Within the high schools, the courses are taught by qualified high school teachers who attend special University training workshops and seminars and teach the courses under the supervision of University faculty. Students enrolled in these courses can receive high school as well as college credit. The college credit the student earns is transferable to a wide range of colleges and universities.

At present, Project Advance is the largest program in the United States that offers regular catalogue college credit courses in the high schools serving over 3000 students in 70 schools in New York and bordering states.

Adopting Principals. Those schools who were considered adopters for this study had either joined the program between the inception of the program in 1972 and the academic year of the study, 1976-77 (N=58), or had made a financial commitment for summer workshops and planned to participate in the next academic year (N=18). For the initial factor analysis these principals were treated as a single group.

The majority of the schools represented were in New York

State. Adopters for 1977-78 included schools outside New York State, in particular those in a demonstration pilot in suburbs near Detroit, Michigan. The conditions for participation by these schools did not, however, differ from those of New York schools.

Non-adopting Principals. Those schools whose administrative staff had requested information about Project Advance had been kept on file since the inception of the program. Those schools who had been represented at informational meetings were also on file. From these files, a list of 140 school principals was generated.

The majority of the schools represented were in New York State. Non-adopters in areas where adoption had been possible, such as New Jersey, were retained. Where non-adoption was clearly precluded by distance, such as California or Alaska, the school was dropped from the study.

Data Collection

The questionnaire (Appendix B) with a self-addressed, stamped, return envelope and the cover letter (Appendix A) were mailed first class on April 4, 1977. One week prior to the mailing, an initialed postcard was sent to each principal to prepare the way for the questionnaire. The text, following, was brief.

> You will receive a survey in a few days in which we would appreciate your cooperation.
> I will be asking for your help in developing guidelines for high school-college articulation programs.

The cover letter and the questionnaire were the same for both adopters and non-adopters except that a small printed note, following, was stapled to the questionnaire sent to non-adopters.

> I realize your district does not offer the program, but we are interested in the ratings of principals in schools that did not implement the program as well as those who did. Your reactions are important for a balanced picture. On questions for which you do not have factual information, your best estimation will do.

Those contextual or situational data on the schools which were not asked on the questionnaire were obtained from state breakdowns by school district. All New York schools were compared using the same reports (New York State Education Department, Note 5). Additionally, a random selection of 100 schools from all possible schools in the state was taken for later comparison to the groups surveyed.

Analysis

The data analysis began with a comparison of adopting schools to non-adopting schools on three situational variables: school size, percentage of graduating seniors going to college, and per pupil expenditure. Additionally, since the samples were not random, a second comparison with a randomly selected (N=100) sample of public high schools in New York State was undertaken to estimate situational (location, size, per pupil expenditure) representativeness of the respondents, non-respondents and the sample groups as a whole.

A factor analysis (principal component, Varimax, using a Kaiser Varimax criterion) of all respondents' Likert ratings was calculated to determine the underlying empirical structure.

A discriminant analysis using factor scales alone, with an F to enter $\geq$ 1.0, was run. This analysis was used to clearly separate out those factors which were the stronger discriminators. The analysis was rerun with situational variables with an F of $\geq$ 1.0 entering first. Cross validation was again calculated.

Discriminant analysis was then calculated to compare adopters by year of adoption to determine whether or not recent adopters had the same intensity on factors as earlier adopters.

RESULTS

Of the 76 questionnaires sent to principals of participating schools, 73 (95%) were returned. All but one were used in the subsequent analyses for a usable response rate of 94%. Of the 127 questionnaires sent to other school principals 88 (69%) were returned. Of these, 67 (53%) were usable.

Situational Variables

Respondents in adopting and nonadopting groups were similar in location (suburban) (Table 1), per pupil expenditure, and percent of seniors going to tertiary institutions.

TABLE 1

Location of Adopters and Nonadopters

		Adopters	Nonadopters	
	COUNT* ROW PCT COL PCT TOT PCT			ROW TOTAL
URBAN		9 56.3 12.5 5.7	7 43.8 8.2 4.5	16 10.2
SUBURBAN		51 48.6 70.8 32.5	54 51.4 63.5 34.4	105 66.9
SMALL TOWN		9 47.4 12.5 5.7	10 52.6 11.8 6.4	19 12.1
RURAL		3 17.6 4.2 1.9	14 82.4 16.5 8.9	17 10.8
	COLUMN TOTAL	72 45.9	85 54.1	157 100.0

Chi Square = 6.47 with 3 degrees of freedom. p = .090

*Count: Actual number of cases in the cell.
Row Pct: Percent of cases in the cell as compared to all cases in that row.
Col Pct: Percent of the cases in the cell as compared to all cases in that column.
Tot Pct: Percent of the cases in the cell as compared to the entire sample.

They differed, however, in senior class size with the adopting group having larger classes on the average (Table 2).

The responding groups were compared to a random sample of 100 schools to determine their representativeness. Both responding groups had significantly larger senior classes and a higher percent of graduating seniors going to tertiary institutions than the random sample. While both adopters and nonadopters spent more per pupil, the differences were not significantly different from the random sample. (Tables 3 and 4)

It may be concluded that the adopting and nonadopting schools responding to this study were not as different as were these respondents combined when compared to a randomly selected group of schools. Thus, the generalizations made from this study must be limited to the particular type of school involved: suburban, large, relatively wealthy, and with a large college bound population. The minimal differences between the responding schools should not be regarded as a drawback, however. This minimized the differences attributable to situational variables.

Adopters ranked the program the same as nonadopters in priority compared to other priorities of the same magnitude (Table 5). Adopters, however, offered more "college credit" type programs for their students (Table 6).

Combined Groups Factor Structures

The respondents for both groups, adopters and nonadopters, were combined to determine the factor solution

TABLE 2

Differences Between Adopting and Nonadopting Respondents on Situational Variables

Per Pupil Expenditure

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES
Between Groups	1	1360.00	1360.00
Within Groups	96	6058752.00	63112.00
TOTAL	97	6060112.00	

	MEAN	STANDARD DEVIATIONS	F RATIO	F PROB.
Adopters	947	255	.022	.856
Nonadopters	954	247		

Per cent of Graduating Seniors Going to Tertiary Institutions

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES
Between Groups	1	111.00	111.00
Within Groups	94	22949.00	244.00
TOTAL	95	23060.00	

	MEAN	STANDARD DEVIATIONS	F RATIO	F PROB.
Adopters	60	15	.454	.509
Nonadopters	58	16		

Size of Senior Class

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES
Between Groups	1	444725.00	444725.00
Within Groups	96	10066436.00	104859.00
TOTAL	97	10511161.00	

	MEAN	STANDARD DEVIATIONS	F RATIO	F PROB.
Adopters	451	396	4.241	.04
Nonadopters	316	201		

TABLE 3

Differences Between Adopters and Control Schools

On Situational Variables

Per Pupil Expenditure

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES
Between Groups	1	211808.00	211808.00
Within Groups	152	9458288.00	62225.56
TOTAL	153	9670096.00	

	MEAN	STANDARD DEVIATIONS	F RATIO	F PROB.
Control:	869.00	247	3.404	0.064
Adopters:	947.00	255		

Per Cent of Graduating Seniors Attending Tertiary Institutions

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES
Between Groups	1	6107.75	6107.75
Within Groups	147	29800.62	202.72
TOTAL	148	35908.37	

	MEAN	STANDARD DEVIATIONS	F RATIO	F PROB.
Control:	47.00	14	30.128	0.001
Adopters:	60.00	15		

Size of Senior Class

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES
Between Groups	1	2346053.00	2346053.00
Within Groups	152	11937920.00	78538.93
TOTAL	153	14283973.00	

	MEAN	STANDARD DEVIATIONS	F RATIO	F PROB.
Control:	193	191	29.871	0.001
Adopters:	451	396		

TABLE 4

Differences Between Nonadopters and Control Schools

On Situational Variables

Per Pupil Expenditure

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES
Between Groups	1	221936.00	221936.00
Within Groups	142	8638736.00	60836.83
TOTAL	143	8860672.00	

	MEANS	STANDARD DEVIATIONS	F RATIO	F PROB.
Control:	869	247	3.648	.055
Nonadopters:	954	247		

Per Cent of Graduating Seniors Attending Tertiary Institutions

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES
Between Groups	1	3734.00	3734.00
Within Groups	137	28131.00	205.00
TOTAL	138	31865.00	

	MEANS	STANDARD DEVIATIONS	F RATIO	F PROB.
Control:	47	14	18.186	0.001
Nonadopters:	58	16		

Size of Senior Class

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES
Between Groups	1	463971.00	463971.00
Within Groups	142	5356256.00	37720.00
TOTAL	143	5820227.00	

	MEANS	STANDARD DEVIATIONS	F RATIO	F PROB.
Control:	193	191	12.3	0.001
Nonadopters:	316	201		

TABLE 5

Priority of the Program

	COUNT / ROW PCT / COL PCT / TOT PCT	Not Important 0	Important 1	ROW TOTAL
Adopters	1	34 47.2 53.1 24.5	38 52.8 50.7 27.3	72 51.8
Nonadopters	2	30 44.8 46.9 21.6	37 55.2 49.3 26.6	67 48.2
	COLUMN TOTAL	64 46	75 54	139 100.0

CHI SQUARE = .014 with one degree of freedom. Significance = .905

TABLE 6

Number of Programs Offering College Credit

Programs		Adopters	Nonadopters	
	COUNT ROW PCT COL PCT TOT PCT	1	2	ROW TOTAL
0		1 11.1 1.4 0.7	8 88.9 11.9 5.7	9 6.4
1		6 37.5 8.2 4.3	10 62.5 14.9 7.1	16 11.4
2		12 44.4 16.4 8.6	15 55.6 22.4 10.7	27 19.3
3		13 44.8 17.8 9.3	16 55.2 23.9 11.4	29 20.7
4		28 70.0 38.4 20.0	12 30.0 17.9 8.6	40 28.6
5		8 61.5 11.0 5.7	5 38.5 7.5 3.6	13 9.3
6		4 100.0 5.5 2.9	0 0.0 0.0 0.0	2.9
7		1 100.0 1.4 0.7	0 0.0 0.0 0.0	1 0.7
9		0 0.0 0.0 0.0	1 100.0 1.5 0.7	1 0.7
	COLUMN TOTAL	73 52.1	67 47.9	140 100.0

Chi Square=19.959 with 8 Degrees of Freedom Significance .01

for the entire group. However, the eight-factor solution had two factors, numbers seven and eight, on which only one item loaded at or above the .40 level. The seventh and eighth factors were "one item factors." Hence, a six-factor solution was calculated for both parsimony and interpretability. The six factors had calculated reliabilities as high as the eight-factor solution. The six-factor solution was selected for use in subsequent analysis (see Table 7). At this point the factors were named. The naming of factors is usually subjective and is based on judgment. A quote from Lewis Carroll's Alice in Wonderland perhaps describes best the true function of factor labels.

> "What's the use of their having names," the Gnat said, "if they won't answer to them?"
>
> "No use to them," said Alice; "but it's useful to the people that name them, I suppose."

The six factors used in subsequent calculations were: Observability, Status, Simplicity, Cost, Trialability, and Relative Advantage cum Compatibility.

The items under each label should be examined for meanings and, as Alice implies, the overall name used only for convenience. The factors generated and the names of the factors are, to a large extent, a function of the operationalizing of the constructs in this study: It should not be assumed that they are exhaustive or mutually exclusive or, as the Gnat said, that they will answer to their names. Additionally, whether a factor is first or second makes little difference: factors loaded in different orders for

Table 7

Eight and Six Factor Solutions

	Characteristic Loadings (8)	Characteristic Loadings (6)
FACTOR I: OBSERVABILITY (II)*		
6. Project Advance offers students important learning advantages.	.5384	.6070
7. Project Advance has a positive effect on student attitudes and motivation	.6859	.7265
8. It is difficult to observe the effects of Project Advance.	-.7989	-.7620
12. The real advantages of Project Advance are hard to prove.	-.7547	-.7687
24. It is easy to see the results of Project Advance.	.7788	.7197
20. Project Advance is a radically different program.	-.4310	-.4996
α =	.96	.97
FACTOR II: STATUS/PRESTIGE (I)		
14. Offering college courses improves the image of the school in the community.	.8178	.7776
15. Project Advance offerings enhance the prestige of high school faculty.	.7520	.7522
16. There is a prestige factor for the school administration in adopting Project Advance.	.7510	.7498
11. Project Advance has high visibility in a high school.	.4199	.4403
α =	.92	.92
FACTOR III: SIMPLICITY (IV)		
4. The financial arrangements for offering Project Advance are complicated.	.6078	.5329
21. Project Advance is a complicated program.	.7699	.7399
22. Offering Project Advance in the high school is simple.	-.6812	-.7255
23. Project Advance is difficult to understand.	.6503	.6579
α =	.85	.87
FACTOR IV: COST (III)		
1. Project Advance start-up costs are low.	.8162	.8045
2. Maintaining Project Advance courses is inexpensive.	.7841	.7256
3. Project Advance offers college credit at low cost to students.	.4239	.4215
4. The financial arrangements for offering Project Advance are complicated.	-.4114	-.5003
5. Project Advance helps retain some senior students.	(-.3304)	-.3979
α =	.87	.91
FACTOR V: TRIALABILITY (V)		
9. Project Advance can be instituted on a limited basis.	.5956	.6173
10. There is little risk to the high school in offering Project Advance.	.5829	.6179
19. Project Advance is compatible with our high school's curriculum.	.7218	.6675
11. Project Advance has high visibility in a high school.	(.3585)	.4724
α =	.80	.82
FACTOR VI: RELATIVE ADVANTAGE (VI)		
5. Project Advance helps retain some senior students.	.6254	(.2130)
13. Project Advance is better than previous programs through which students could earn college credit or exemption.	.6236	.5280
18. On the whole, Project Advance is not new in its intent.	-.6262	-.5719
3. Project Advance offers college credit at low cost to students.	(.2126)	.4649
17. Project Advance is similar to other programs we have used.	(-.0621)	-.6467
20. Project Advance is a radically different program.	(.3186)	.5456
α =	.67	.62
FACTOR VII:		
17. Project Advance is similar to other programs we have used.	.8398	
FACTOR VIII:		
11. Project Advance has high visibility in a high school.	.4865	

*Order of factors for eight factor solution.

adopters, nonadopters, the pooled eight-factor solution, and the six-factor solution.

With adopters proportional represented by year of adoption and an F to enter for all variables of $\geq$ 1.0, the cross validation of respondents using a discriminant function based on situational variables and factor scores was significant ($p = .02$). The only situational variable entering this calculation was senior class size. The factors entering were Status, Cost, and Trialability (Tables 8 and 9).

A cross classification analysis, conducted over the remaining sample not used in the original analysis, indicated that 75% of the adopters and 61.9% of the nonadopters could be correctly classified using the discriminant function (Table 10). The total percent of the remaining sample which could be correctly classified was 68.89%. This yielded a Chi Square of 4.82 with one degree of freedom, significant at the .05 level.

A discriminant analysis with adopters classified by year indicated recent adopters were significantly different from earlier adopters (Table 11 and 12). Cross classification correctly placed 76% of the withheld cases (Table 13). All factors entered this calculation except for Cost. Recent adopters (1977) were then removed from the analysis and early adopters were compared to nonadopters. Most (70.5%) of the earlier adopters and nonadopters could be correctly classified using the discriminant function derived from the factors Status, Cost and Trialability.

TABLE 8

Adopters and Nonadopters: Discriminant Analysis From Situational Variables and Factor Scales (F to enter 1.0)

Step Number	Variable Entered	F to Enter or Remove	Wilks' Lambda	Sig.	RAO's V	Change in RAO's V	Sig. of Change
1	SIZE	1.473	0.9764	0.229	1.473	1.473	0.225
2	TRIAL	5.717	0.8914	0.032	7.428	5.954	0.015
3	STATUS	3.748	0.8382	0.015	11.777	4.349	0.037
4	COST	1.426	0.8180	0.019	13.567	1.789	0.181

Discriminant Function	Eigenvalue	Canonical Correlation	Wilks' Lambda	Chi-Square	DF	Significance
1	0.22238	0.427	0.8181	11.84	4	0.019

Standardized Discriminant Function Coefficients

	Function 1
Size	0.24333
Status	-0.70384
Cost	0.34467
Trial	1.04103

Centroids of Groups in Reduced Space

	Function 1
Adopters	0.35472
Nonadopters	-0.50480

TABLE 9

Adopters and Nonadopters: Means and Standard Deviations for Discriminant Analysis for Situational Variables and Factor Scales (F to enter $\geq$ 1.0)

	ADOPTERS	NONADOPTERS	TOTAL CASES
CASES	37.00	26.00	63.00
MEANS			
COST	941.324	975.692	955.507
SIZE	446.459	340.038	402.539
FACTOR 1*	3.799	3.685	3.752
FACTOR 2	3.723	3.701	3.714
FACTOR 3	3.599	3.384	3.510
FACTOR 4	3.695	3.451	3.595
FACTOR 5	3.898	3.596	3.773
FACTOR 6	3.474	3.411	3.448
STANDARD DEVIATIONS			
COST	248.613	239.810	243.655
SIZE	413.529	200.171	343.860
FACTOR 1	0.6434	0.4145	0.5593
FACTOR 2	0.5489	0.5702	0.5533
FACTOR 3	0.6880	0.4315	0.6010
FACTOR 4	0.6295	0.5197	0.5947
FACTOR 5	0.4308	0.4748	0.4703
FACTOR 6	0.4078	0.3396	0.3795

*Factor 1: Observability
Factor 2: Status
Factor 3: Simplicity
Factor 4: Cost
Factor 5: Trialability
Factor 6: Relative Advantage

TABLE 10

Adopters and Nonadopters: Classification Analyses with Situational Variables and Factor Scales

(F to enter > 1.0)

Actual Group	# of Cases	Predicted Adopters	Predicted Nonadopters
Adopters	48	34 70.8%	14 29.2%
Nonadopters	46	16 34.8%	30 65.2%
Cross Validation of Adopters	24	18 75.0%	6 25.0%
Cross Validation of Nonadopters	21	8 38.09%	13 61.90%

Percent of "grouped" cases correctly classified: 68.09%
Percent of cross validation sample correctly classified: 68.89%

TABLE 11

Results of the Discriminant Analysis Using Factor Scales to Compare 1977 Adopters to Earlier Adopters

Step Number	Variable Entered	F to Enter or Remove	Wilks' Lambda	Sig.	RAO's V	Change in RAO's V	Sig. of Change
1	Observability	5.518	0.92692	0.022	5.511	5.511	0.019
2	Simplicity	5.285	0.86097	0.006	11.297	5.785	0.016
3	Rel. Advantage	1.384	0.84379	0.009	12.954	1.656	0.198
4	Trialability	1.063	0.83060	0.013	14.270	1.316	0.251
5	Status	2.536	0.79986	0.010	17.511	3.240	0.072

Discriminant Function	Eigenvalue	Canonical Correlation	Wilks' Lambda	Chi-Square	DF	Significance
1	0.2502	0.447	0.7999	15.07	5	0.010

Standardized Discriminant Function Coefficients

	Function 1
Observability	-0.74300
Status	0.53637
Simplicity	0.51250
Trialability	-0.54107
Relative Advantage	-0.23229

Centroids of Groups in Reduced Space

	Function 1
1977 Adopters	0.76937
Earlier Adopters	-0.25647

TABLE 12

Recent and Earlier Adopters: Means and Standard Deviations of Factor Scales Used in the Discriminant Analysis (F to enter $\geq$ 1.0)

	NEW ADOPTERS	EARLY ADOPTERS	TOTAL CASES
CASES	18.00	54.00	72
MEANS			
FACTOR 1*	3.509	3.885	3.791
FACTOR 2	3.773	3.819	3.807
FACTOR 3	3.722	3.470	3.533
FACTOR 4	3.750	3.742	3.744
FACTOR 5	3.787	4.004	3.950
FACTOR 6	3.300	3.488	3.441
STANDARD DEVIATIONS			
FACTOR 1	0.3939	0.6383	0.6068
FACTOR 2	0.5191	0.5525	0.5411
FACTOR 3	0.4842	0.7060	0.6635
FACTOR 4	0.4774	0.6270	0.5900
FACTOR 5	0.4203	0.4517	0.4512
FACTOR 6	0.3236	0.3764	0.3710

*Factor 1: Observability
Factor 2: Status
Factor 3: Simplicity
Factor 4: Cost
Factor 5: Trialability
Factor 6: Relative Advantage

TABLE 13

Recent and Early Adoptors: Classification Analysis with Situational Variables and Factor Scales (F to enter $\geq$ 1.0)

Actual Group	Number of Cases	Predicted Group Membership New Adopters	Earlier Adoptors
New Adoptors	18	15 83.3%	3 16.7%
Earlier Adoptors	54	14 25.9%	40 74.1%

Percent of "grouped" cases correctly classified: 76.39%

DISCUSSION

> *From past research, it becomes obvious that many variables influence the adoption or rejection of new ideas: the situation; the personality; social and economic status of the adopter; the lines of communication used; and the innovation itself. While many of the past studies have regarded all innovations as equivalent units of analysis, perhaps a more realistic approach involves an examination of the characteristics of the innovation itself.*
>
> *Rogers, 1968*

Perceived Characteristics

Rogers and Shoemaker (1971) suggested that "factor analysis offers analytical potential for deeper probing of the nature of innovation perceptions." This study used the five categories of perceptions described by Rogers and Shoemaker to construct the Likert-type items used in the Model Program Survey. These five categories of perceptions were: 1) Relative Advantage, 2) Compatibility, 3) Complexity, 4) Trialability, and 5) Observability. In the construction of the survey form, however, more emphasis was placed on the inclusion of items relating to status and prestige than is usually found in the rural sociology literature. This was included under the rubric of Relative Advantage since that category includes both financial and social advantages. Pincus (1974) and Giacquinta (1975) indicate that Status is equivalent to financial payoff or risk.

The factor analysis of the responses, when limited to a six-factor solution, produced factors similar to those described by Rogers and Shoemaker. They were 1) Observability,

2) Status, 3) Simplicity, 4) Cost, 5) Trialability, and 6) Relative Advantage cum Compatibility (see Table 7). Other labels for these factors, using the original definitions, could be Status and Cost as Relative Advantage I and II. Instead of Relative Advantage, the sixth factor could be retitled Compatibility.

Observability

Hahn (1974) renamed this factor "Observability of Valued Outcomes." The redefinition appears to apply to the findings of this study as well. The items were loaded most highly on the effects and advantages of the program. The respondents appeared to believe the results and advantages were observable. Exactly which results were observable appears to be defined by two items relating to learning advantages, student activities, and motivation.

This factor loaded first both in this study and Hahn's. It remains open to question whether or not the innovation does, in fact, actually motivate students or that this motivation of students is observable. It evidently is the case, however, that principals responding to the survey perceived the program as one which met these criteria.

One other item loaded moderately on this factor but does not clearly fit the two subdimensions mentioned. The item describes the innovation as "a radically different program." One slightly facetious supposition would be

that since the programs motivate students, it is radically different.

Status

This factor is usually covered by a single item having to do with social approval. Hahn (1974) had no items relating to status. Clinton (1972) had one item which dealt with colleague approval. This study had three items designed to test this category. Four items loaded on the factor, however, with the fourth relating to high visibility of the innovation.

It is worth noting that the three items relating to status and prestige loaded highly on this factor but not on others and that the alpha reliability was .92. This would seem more than adequate to establish these items as composing a cohesive factor that must be considered eligible on its own merits. It would also appear that this factor could be used as a major variable in adoption studies carrying the same sort of weight that cost has for agricultural innovations.

Simplicity

Often titled "complexity," this factor emerged with all but one of the items designed to measure the factor loading on this factor alone. Only one item, relating to complex financial arrangements, loaded on another factor (Cost) as well as on Simplicity. The subdimensions of this factor were related to difficulties in explaining the program

to others and in implementing and administering the program.

Cost

The four items on the questionnaire relating to costs loaded together to define this factor. One additional item ("Project Advance helps retain some senior students") also loaded on this factor. Cost is usually considered an important factor in adoption decisions, and in entrepreneur type activities it is the major defining subdimension of relative advantage. Costs evidently are perceived as an aspect of the innovation used in this study; and, even though schools are not among profit-making institutions, cost is a factor in decision-making.

Trialability

Hahn found cost and trialability combined to form a factor she titled "feasibility." That was not the case in this study. Trial included "limited trial," "risk," "compatibility," and, to a lesser degree, "visibility." It would appear that the innovation was perceived as compatible and thus may have involved relatively little risk. High visibility mitigates this interpretation, however, since a "high visibility" trial of an innovation would increase the risk. "Visibility" did not load highly enough to be dealt with in a clear manner in relationship to the other items and should be interpreted with caution.

Relative Advantage

Both Hahn (1974) and Clinton (1972) found efficiency

an important subdimension of relative advantage. This interpretation was not clear in this study though it could be so interpreted. The factor contained disparate items with a low alpha reliability for the factor of .42. The items that loaded most highly and held together logically had to do with compatibility. Since this category had not emerged as a separate factor, this label may be a more accurate description. Because of the low reliability and mixed nature of the items this factor does not hold up under close scrutiny and, while it does serve to include stray items, should not be regarded as definitive in any way.

Implications

To some extent, this type of analysis may be categorized as "market research." That is, research and development folks are somewhat naive about marketing (Farr, 1969). One must admit, at the least, to a certain amount of pragmatism about program development and dissemination. This stance is not amoral, however. It is a reasonable proposition that the consumers, in this case the schools, should have their views recognized and taken into consideration in the process. They have to face publics that the research and development staff are removed from by several degrees. The primary research and development "public" is the federal agency (and peers) from which funds have been derived for the project.

This study holds two implications for developers and

disseminators of articulation programs: 1) Some aspects of the programs are more important than others; 2) Some types of schools are more likely to adopt or be interested in adoption than others.

The factors that appeared to discriminate between the adopters and nonadopters were trialability, status, and cost. This would indicate the adopters perceived the innovation to be one which could be tried while the nonadopters perceived difficulties in a limited trial. Since cost was also an important factor, it is likely that the trial was seen as a more expensive undertaking by nonadopters than adopters. The costs of teacher training and materials may be reduced, but the shortcuts are not apparent until implementation is examined in detail and the cost savings are explained by the program staff. These methods need to be made clear early in the contacts with interested schools.

Status would appear to refer to the prestige accruing to the high school in offering a program where students earn college credit. This is undoubtedly derived, to a large extent, from the reputation of the college or university involved. Thus, it would appear that a program offered by a prestigious higher education institution would have advantages that some institutions, such as two-year colleges, would not have.

The factors that appeared to discriminate between adopters and nonadopters point to dissemination procedures that may be easily operationalized. Status is evidently

important to an adopting school. This would indicate that an institution undertaking the development of an articulation program should consider how far its reputation will carry beyond districts contiguous to the college itself.

The cost and trialability factors are typical of implementation problems. If the trial can be made simple and the cost reduced for implementation of the trial, adoption would appear more likely. Suburban, large, relatively wealthy schools with a high proportion of college bound students are more likely to adopt the program than small schools with less wealth and a smaller proportion of seniors going to college after graduation. This indicates simply that both the need for such programs must exist and that the resources necessary to offer the program are available. The target population is rather easy to describe and adds little that could not be intuitively derived.

Since this study involved only one innovation, generalizations to other innovations must be extremely limited. Trialability and cost have been found to be important in other studies and some confidence is lent to setting forth these characteristics of innovations as important considerations. That is, the implementation of any innovation may be enhanced by developing methods that minimize these barriers.

Status does not have the background in the literature that trial and cost have and must be generalized with more caution. However, the proposition that status or prestige

is an important payoff for bureaucracies is appealing. Power and efficiency are also important, but they have long been recognized as factors which account for a significant proportion of innovative behavior of organizations. Status or prestige has been, for the most part, ignored. Should this category be used in future studies, there is some indication that it may account for a portion of adoption behavior.

APPENDIX A

Cover Letter for Survey Form

SYRACUSE UNIVERSITY
PROJECT ADVANC
759 OSTROM AVENUE | SYRACUSE, NEW YORK 13210
315/423-[illegible]04

Several agencies have expressed an interest in developing cooperative programs similar to Syracuse University Project Advance. As part of my response to them, I am currently trying to identify important characteristics and potential effects of the Project from your vantage point. I am writing to ask for your help in this study by completing the enclosed questionnaire. Your individual responses will, of course, be confidential.

If you have any questions or comments, please do not hesitate to call me at (315) 423-2404.

Thanks for your help.

Sincerely,

Robert E. Holloway
Associate Director
for Project Advance

REH:jb
Enc.

APPENDIX B

Model Program Design Survey Form

MODEL PROGRAM DESIGN SURVEY

Shall we send you the tabulation of replies? ☐Yes ☐No

Shall we send you the final recommendations? ☐Yes ☐No

School _____

Would you classify your school as:

☐Urban
☐Suburban
☐Small Town
☐Rural

Please indicate college credit or exemption options available to your students.

☐None ☐AP Tests ☐Project Advance
☐CLEP ☐AP Classes ☐Early Graduation
☐Cooperative programs (Please list) ☐ACTP

_____

_____

When you first read or heard about Project Advance, what features struck you most negatively?

Which features of the program impressed you most positively?

If you recall, list those factors which you believe to have been most important in determining your district's decision regarding Project Advance.

Given that discretionary funds were available, please select and rank the *three* most important expenditures for your school. Indicate your first choice with the number 1, the second with the number 2, and number 3 for your lowest priority.

___ Project Advance
___ Library media
___ Supplemental texts
___ Teacher aides
___ Vocational Programs
___ Other (_____)

SUPA77

OVER PLEASE

Listed below are several statements which might describe Project Advance. Simply circle the degree to which each statement accurately describes the program or potential effects of the program in your judgement. To qualify, expand, or emphasize statements, please make notes under "comments," after judging the statement.

EXAMPLE: Project Advance offerings displace other elective programs.

Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly
DS	D	N	(A)	AS

In the example, the respondent felt the statement was somewhat accurate but had reservations. Neutral ("N") can mean you have no strong reaction to the descriptive statement or that you are unsure or ambivalent.

	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly
1. Project Advance start-up costs are low.	DS	D	N	A	AS
2. Maintaining Project Advance courses is inexpensive.	DS	D	N	A	AS
3. Project Advance offers college credit at low cost to students.	DS	D	N	A	AS
4. The financial arrangements for offering Project Advance are complicated.	DS	D	N	A	AS

Comments:

	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly
5. Project Advance helps retain some senior students.	DS	D	N	A	AS
6. Project Advance offers students important learning advantages.	DS	D	N	A	AS
7. Project Advance has a positive effect on student attitudes and motivation.	DS	D	N	A	AS
8. It is difficult to observe the effects of Project Advance.	DS	D	N	A	AS

Comments:

	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly
9. Project Advance can be instituted on a limited basis.	DS	D	N	A	AS
10. There is little risk to the high school in offering Project Advance.	DS	D	N	A	AS
11. Project Advance has high visibility in a high school.	DS	D	N	A	AS
12. The real advantages of Project Advance are hard to prove.	DS	D	N	A	AS

Comments:

	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly
13. Project Advance is better than previous programs through which students could earn college credit or exemption.	DS	D	N	A	AS
14. Offering college courses improves the image of the school in the community.	DS	D	N	A	AS
15. Project Advance offerings enhance the prestige of high school faculty.	DS	D	N	A	AS
16. There is a prestige factor for the school administration in adopting Project Advance.	DS	D	N	A	AS

Comments:

	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly
17. Project Advance is similar to other programs we have used.	DS	D	N	A	AS
18. On the whole, Project Advance is not new in its intent.	DS	D	N	A	AS
19. Project Advance is compatible with our high school's curriculum.	DS	D	N	A	AS
20. Project Advance is a radically different program.	DS	D	N	A	AS

Comments:

	Disagree Strongly	Disagree	Neutral	Agree	Agree Strongly
21. Project Advance is a complicated program.	DS	D	N	A	AS
22. Offering Project Advance in the high school is simple.	DS	D	N	A	AS
23. Project Advance is difficult to understand.	DS	D	N	A	AS
24. It is easy to see the results of Project Advance.	DS	D	N	A	AS

Comments:

Please return to Syracuse University Project Advance, 759 Ostrom Ave., Syracuse, N.Y. 13210.

Thank you

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